J. Adelaide Bot. Gard. 6(1): 41-54 (1982)

# A TAXONOMIC REVISION OF THE GENUS *IXODIA* (ASTERACEAE)

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**Abstract**

The endemic Australian genus *Ixodia* is revised and two species are recognized, namely *I. achillaeoides* R. Br. in Ait. f. and *I. flindersica* Copley, sp. nov. In addition, 3 subspecies of *I. achillaeoides*, namely ssp. *achillaeoides*, ssp. *alata* (Schltdl.) Copley and ssp. *arenicola* Copley are recognized. Keys, descriptions, illustrations and distribution maps are provided, together with notes on ecology.

## Nomenclatural History of the Genus

The genus *Ixodia* was first collected by Robert Brown at Memory Cove near Port Lincoln (South Australia) in February, 1802. It was subsequently briefly described by him in the manuscript of his Australian collections and given the name *Ixodia gnaphaloides*. However, Brown did not deal with the Asteraceae in his 'Prodromus' (1810), and this name was never published.

The first published diagnosis of *Ixodia* appeared in W.T. Aiton's "Hortus Kewensis" in 1812. Aiton (1812) acknowledged that the generic name had been supplied by Brown, and in fact Bennett (1866) attributed the compilation of the Compositae, among other families, to Robert Brown.

Sims in Curtis's Botanical Magazine (1813), stated that Brown was the author of this species. The correct author citation for *Ixodia* should therefore be R. Br. in Ait. f. This is in accordance with the International Code of Botanical Nomenclature (1978, p 40), which states that "when a name with a description or diagnosis (or reference to a description of a diagnosis) supplied by one author is published in a work by another author, the word *in* should be used to connect the names of the two authors". Until now the accepted citation has been R. Br. ex Ait. which failed to give Brown credit for the diagnosis and also failed to show that Aiton the younger was responsible for the publication.

The validly published type species for the genus is *I. achillaeoides*, published by Aiton in 1812. However, in Curtis's Botanical Magazine (1813), Sims omitted a letter *a* from the specific epithet, resulting in the spelling '*achilleoides*'. This latter spelling was subsequently adopted by De Candolle (1837) and Schlechtendal (1847), and used in nearly all references to this species until Eichler (1965) corrected it in his 'Supplement to J.M. Black's Flora of South Australia'.

Only the single species, *I. achillaeoides*, was orginally recognized. Subsequently, Sprengel (1827) transferred *Ammobium alatum* to *Ixodia* as *I. ammobium* but apparently no later workers accepted this change (Orchard, 1982). *Ammobium* is currently recognized as a genus consisting of two species, allied, but not necessarily closely related, to *Ixodia* (Orchard, 1982).

In 1847, Schlechtendal described a new species, *Ixodia alata*, from a specimen collected by Dr Behr in the Barossa Ranges near Tanunda, South Australia. He distinguished this species from *I. achillaeoides* by its larger stature, longer and broader leaves and greater degree of leaf base decurrence forming wings down the stem.

Another species, *I. ptarmicoides*, was described by Mueller in 1853 from specimens

collected by Carl Wilhelmi between Mount Dutton and Coffin Bay on Eyre Peninsula, South Australia. Mueller claimed that this species had a smaller stature and thicker shorter leaves which were less glutinous and less decurrent than *I. alata*. He also distinguished it from *I. achillaeoides* by its thicker, more obtuse leaves and more obtuse spathulate involucral bracts.

Both *I. alata* and *I. ptarmicoides* were accepted by Sonder (1853). However, in 1866 Bentham relegated them to synonymy in *I. achillaeoides*, pointing out that the species has two forms, "of which the extremes look very different, '*I. achillaeoides*', with narrow leaves, obtuse or with recurved points, not very decurrent, and with small flower-heads, and '*I. alata*' with broader, more acute and more decurrent leaves and larger flower-heads". But, he continued, "there are many specimens equally referable to the one or to the other". Bentham and Hooker (1873) and Black (1929) followed this recognition of a single, monotypic, but variable genus.

In 1931, Ewart sought to recognize the south-western Victorian plants with broader leaves and larger capitula as *I. achillaeoides* var. *alata* (Schltdl.) Ewart, but Willis (1972) pointed out that "there seems to be no sharp line of demarcation between var. *alata* and the typical form (Eyre Peninsula, S. Aust.)".

While preparing a paper on the subgenus *Ozothamnus* of the genus *Helichrysum* Burbidge found that the Tasmanian species *Helichrysum angustum* Wakefield had been generically misplaced. This species has long receptacular scales between the florets and lacks a pappus, and for these reasons Burbidge (1958) placed it in the genus *Ixodia* as *I. angusta*.

In 1977 Morris described a further Tasmanian species, *I. achlaena*, which lacks a pappus. This species also lacks receptacular bracts but, as in *I. achillaeoides*, a "pseudo-pappus" ring of pappillae is present.

Orchard (1982), however, has recently reviewed the generic affinities of the Tasmanian species of *Ixodia* and concludes that they show as great, if not more, similarity to *Haeckeria* and *Cassinia* than they do to *Ixodia achillaeoides* and, for this reason, has segregated them as a new genus *Odixia*.

The genus *Ixodia* has, therefore, once again come to be considered as monotypic but in the present revision a new species is described from the Northern Flinders Ranges, South Australia, and the type species, *I. achillaeoides*, is subdivided into three easily recognized subspecies.

## IXODIA R.Br. in Ait.f.

**Ixodia** R. Br. in Ait. f., Hort. Kew. 2nd ed., 4: 517 (1812); Curtis's bot. Mag. t. 1534 (1813); DC. Prodr. 6: 154 (1837); Benth., Fl. Austral. 3: 582 (1866); Benth. in Benth. & Hook. f., Gen. Pl. 2: 318 (1873); Ewart, Fl. Vict. 1144 (1931).

*Type*: *I. achillaeoides* R. Br. in Ait. f., Hort. Kew, 2nd ed., 4: 517 (1812).

Shrub to 3.5 m high, decumbent, ascending or erect, glabrous. *Leaves* alternate, sub-erect or spreading, sessile to decurrent, narrow-linear, linear, narrowly rhombic or obovate, usually dark-green above, light-green below, glabrous to slightly sericeous-woolly, viscid, apices acute to obtuse, often with recurved tips; margins entire, flat or revolute; midvein usually impressed above, prominent below. *Inflorescence* terminal, corymbose, with few to many capitula; *capitula* homogamous, discoid, sessile to shortly pedunculate, ovoid, depressed-ovoid, urceolate or cylindrical, (3-) 4-9 (-10) mm long (1-) 2-8 mm wide (excluding the radiating laminae) with (17-) 20-50 (-54) imbricate, appressed, light-green, brown or reddish-brown, cartilaginous, glabrous or sericeous-

woolly involucral bracts; *outer involucral bracts* usually in 2-4 whorls, appressed over lower three-quarters, slightly recurved distally, spathulate, narrowly elliptic, narrowly obovate or obovate, acute to obtuse, 1-6 mm long, 0.5-2.5 mm wide; *inner involucral bracts* usually in 2 whorls, spathulate to narrowly obovate or obovate with conspicuous radiating white scarious petaloid laminae from about one quarter to one half the length of their narrow erect claws; *laminae* acute to obtuse, glabrous or covered on the adaxial surface by simple, subcylindrical, somewhat flattened, eglandular hairs; *receptacle* conical, bearing chaffy involute scales or cartilaginous petaloid bracts enveloping or subtending each floret. *Florets* often slightly exserted; corolla tubular, bisexual, 5-toothed, usually with glandular hairs on the abaxial surfaces of the teeth, cream, yellow or reddish; style terete, bifurcate, the base uninflated; stamens 5; anthers linear-caudate. *Achene* 3- to 4-angled, glabrous or papillose-pubescent, narrowly oblong, oblong or obovate; pappus absent; 'pseudo-pappus' or membranous rim with simply, erect (papillae) projecting from it.

*Distribution*

The genus *Ixodia* is restricted to southern mainland Australia, with one species endemic to the northern Flinders Ranges (South Australia) and one species widespread in southern South Australia and south-western Victoria.

*Affinities*

*Ixodia* is allied to *Ammobium* R. Br. and *Odixia* A.E. Orchard due to the presence of a receptacular bract subtending each floret, except in *O. achlaena* (D.I. Morris) A.E. Orchard, and the presence of a pseudopappus ring or cup at the summit of the achene, except in *O. angusta* (N.A. Wakefield) A.E. Orchard. However, it differs from these genera in the number of florets per capitulum, the number of capitula per inflorescence and the form of capitulum disintegration and achene shedding. Affinities with, and differences to, species in *Helichrysum* subgenus *Ozothamnus* and *Cassinia* sect. *Rhynea* have been discussed by Orchard (1982).

**Key to the Species**

1a. Laminae of inner involucral bracts glabrous; each floret enveloped by a scarious receptacular scale; achene papillose-pubescent ..... *I. achillaeoides*

1b. Laminae of inner involucral bracts covered with simple flattened sub-cylindrical hairs on their adaxial surface; each floret subtended and partially enveloped by a cartilaginous, petaloid, bract-like scale; achene glabrous ..... *I. flindersica*

1. **Ixodia achillaeoides** R. Br. in Ait. f., Hort. Kew. 2nd ed., 2: 517 (1812). Black, Fl. S. Austr. 2nd ed., 919 (1957) pro parte (excluding specimens from Flinders Ranges).

*Type*: *Brown s.n.*, Bay xi, South Coast, (Memory Cove near Port Lincoln, South Australia), (K, 3 spec., syn.; photo!).

Shrub to 2 m high, erect or dwarfed and compact, branching in upper part, glabrous. *Leaves* variable (see detailed descriptions of infra-specific taxa), alternate, more or less decurrent, often forming a wing down the stem, narrow-linear, linear, narrowly rhombic or obovate, dark green above, paler below, glabrous, viscid; apex acute to obtuse, often with a recurved tip, margins entire, usually flat. *Inflorescence* corymbose, terminal with 3-80 capitula; *capitula* urceolate to ovoid (3-) 4-9 mm long, (1-) 2-8 mm wide with (17-) 20-40 (-54) imbricate, light-green to brown cartilaginous, glabrous or sericeous-woolly involucral bracts; *outer involucral bracts* narrowly oblong to narrowly elliptic, acute to


Fig. 1. *Ixodia achillaeoides* ssp. *achillaeoides*. A, habit; B, inflorescence; C, typical leaf; D, inner involucral bract with radiating lamina; E, floret with receptacular scale; F, achene (from *D.N. Kraehenbuehl 870*, Stenhouse Bay).

obtuse; inner involucral bracts spathulate, with white, papery, petaloid obtuse to bluntly acute, glabrous laminae about half the length of their narrow cartilaginous claws; *receptacle* conical, bearing chaffy involute scales (sometimes with a petaloid tip) subtending and enveloping each floret. *Florets* usually slightly exserted; corolla cream or green tinged with red; style-base not inflated. *Achenes* 4-angled, narrowly oblong to oblong, papillose-pubescent; pappus absent.

*Distribution* (Figs 2, 4 and 6)

*I. achillaeoides* consists of three subspecies which occur in southern South Australia and south-western Victoria.

**Key to the Subspecies of *I. achillaeoides***

1a. Leaves narrow-linear, linear, narrowly rhombic, or lanceolate; plants found in inland habitats ..... 1c. ssp. *alata*

1b. Leaves oblanceolate to obovate; plants found in coastal habitats ..... 2

2a. Leaves oblanceolate, less than 5 mm wide; capitula urceolate, less than 5.5 mm long and 4.0 mm wide; laminae of 2-4 mm long, 1-2 (-3) mm wide ..... 1a. ssp. *achillaeoides*

2b. Leaves obovate, greater than 6 mm wide; capitula sub-globose to globose, greater than 6.0 mm long and 6.5 mm wide; laminae of 4-6 mm long, 3-5 mm wide ..... 1b. ssp. *arenicola*

## 1a. ssp. **achillaeoides**

*Ixodia achillaeoides* R. Br. ex Ait. f., Hort. Kew. 2nd ed., 4: 517 (1812); Curtis's bot. Mag. t. 1544 (1813); DC., Prodr. 6: 154 (1837).

Shrub ascending to erect, often dwarfed and compact, 10-80 cm tall. *Leaves* oblanceolate to narrowly obovate, 4-35 (-40) mm long, 0.5-5 mm wide, with bases more or less decurrent onto the branches, coriaceous to fleshy, more or less viscid. *Capitula* urceolate, 4.0-5.5 mm long, (1.8-) 2-4 mm wide; laminae of inner involucral bracts 2.0-4.0 mm long, 1.0-2.0 (-3.0) mm wide. (Fig. 1).

*Distribution* (Fig. 2).

This subspecies occurs along the southern coastline of Yorke and Eyre Peninsulas, the southern and western coastlines of Kangaroo Island and on some of the nearby islands (e.g. Wedge Island).

*Comments*

*I. achillaeoides* ssp. *achillaeoides* is a strictly coastal taxon growing on coastal cliffs and exposed coastal sand dunes. Specimens collected from Cape Spencer on Yorke Peninsula (*P.B. Copley 143*) and from Cape Gantheaume on Kangaroo Island (*P.B. Copley 57*) were found to have chromosome numbers of n = 13.

*Selection of Specimens examined* (77 seen)

SOUTH AUSTRALIA: Eyre Peninsula: *Alcock 931*, "West Point", hundred of Flinders, c. 15 km south of Port Lincoln, 31.i.1966 (AD); *B. Copley 2455*, Cape Wiles, 25.i.1969 (AD); *Specht 2701*, Flinders Flora and Fauna Reserve, c. 15 km south-south-east of Port Lincoln, 10.xi.1960 (AD); *Spooner 3265*, Lincoln National Park, 7.i.1974 (AD); *Williams 2099*, Cape Wiles, 16.iv.1965 (AD).

Yorke Peninsula: *Blaylock 454*, Pondalowie Bay, 27.iii.1967 (AD); *P.B. Copley 142-146*, 14.2 km north-east of Marion Bay on Warooka road, 19.iii.1977 (AD); *Donner 457*, c. 8 km north of Marion Bay, 23.iv.1962 (AD); *Kraehenbuehl 870*, Stenhouse Bay, 6.i.1963 (AD); *Major 47*, Wedge Island, 1973 (AD); *Simpson s.n.*, Pondalowie Bay, December, 1928 (AD-); *Rounsevell 16*, Wedge Island, 15.v.1969 (AD).

Kangaroo Island: *P.B. Copley 57-68*, Cape Gantheaume Conservation Park, 6.iii.1977 (AD); *P.B. Copley 84-88*, mouth of South-West River, 7.iii.1977 (AD); *Eichler 15391*, Cape du Couedic (near the lighthouse),

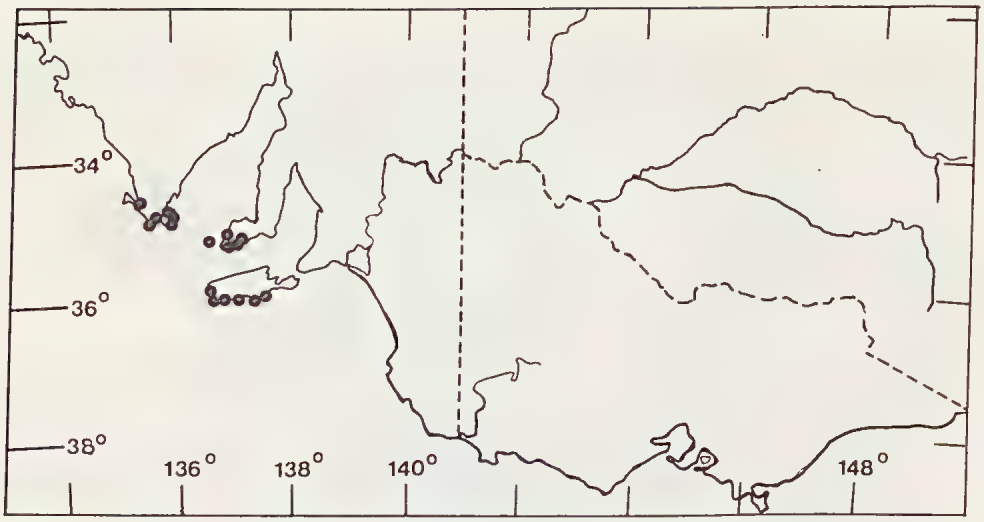


Fig. 2. Distribution of *Ixodia achillaeoides* ssp. *achillaeoides*

11.xi.1958 (AD); *Ising s.n.*, D'Estree's Bay, January, 1923 (AD 97020244); *Kraehenbuehl 6*, sandhills at Seal Bay, 2.i.1958 (AD); *Lothian 792*, Seal Bay, facing sea, 10.i.1962 (AD); *Schodde 519*, Cape du Couedic lighthouse, 27.xii.1957 (AD).

### 1b. ssp. **arenicola** Copley, ssp. nov.

*Frutex* decumbens vel adscendens, 35-50 cm altus. *Folia* obovata, 10-30 mm longa, 6-10 mm lata, basis plus minusve decurrentibus in ramulos, coriacea, plus minusve viscida. *Capitula* subglobosa vel globosa, 6.0-7.5 mm longa 6.5-7.5 mm lata; bractearum involucratarum interiorarum laminae lata obovatae, 4-6 mm longae, 3-5 mm latae.

*Holotype*: *D. Hunt 1883*, Port MacDonnell, c. 25 km south of Mt Gambier, 14.ii.1964 (AD).

Shrub decumbent or ascending, 35-50 cm tall. *Leaves* obovate, 10-30 mm long, 6-10 mm wide, with bases decurrent onto the branches, coriaceous more or less viscid. *Capitula* sub-globose to globose, 6.0-7.5 mm long, 6.5-7.5 mm wide; laminae of inner involucral bracts broadly obovate, 4-6.0 mm long, 3-5 mm wide (Fig. 3).

*Distribution* (Fig. 4).

*I. achillaeoides* ssp. *arenicola* is only known from small areas on the coast near Portland, Victoria and Douglas Point, west-north-west of Port MacDonnell in the south-east of South Australia.

*Comments*

This subspecies is possibly only a clinal extension of what is here recognized as *I. achillaeoides* ssp. *alata*, but for the present it is distinguished by its larger and broader obovate leathery leaves. Specimens available and ascribed to ssp. *arenicola* appear quite distinct, but further studies are needed.

*Specimens examined*

SOUTH AUSTRALIA: South Eastern Region: *Cleland s.n.*, Point Douglas c. 15 km west-north-west of Port MacDonnell, 15.ii.1948 (AD 97227046); *P.B. Copley 208*, Point Douglas, South-East, S.A., 25.iii.1978;

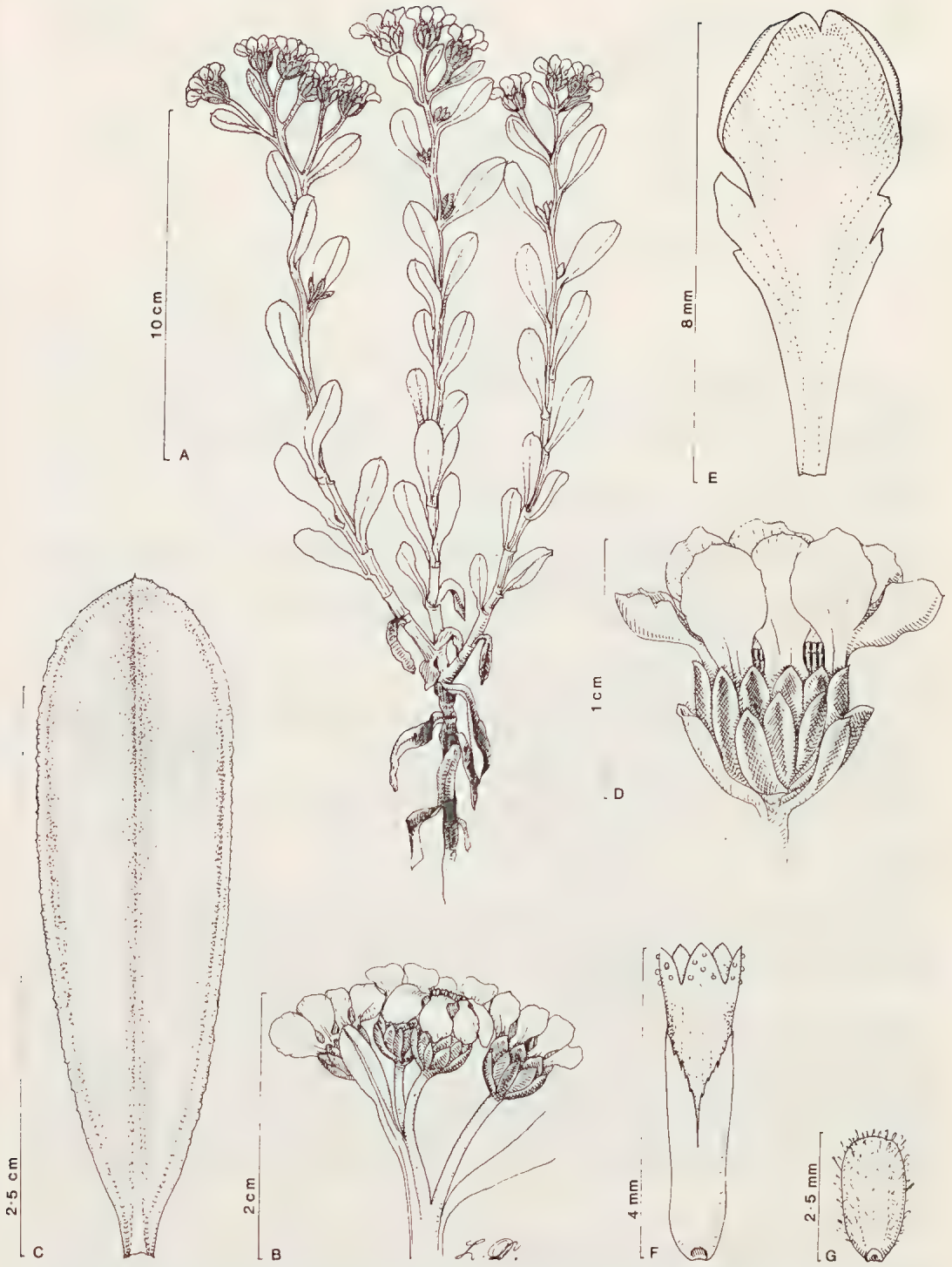


Fig. 3. *Ixodia achillaeoides* ssp. *arenicola*. A, habit; B, inflorescence; C, typical leaf; D, capitulum; E, inner involucral bract with radiating lamina; F, floret with receptacular scale; G, achene (from *D. Hunt 1883*, Port MacDonnell).

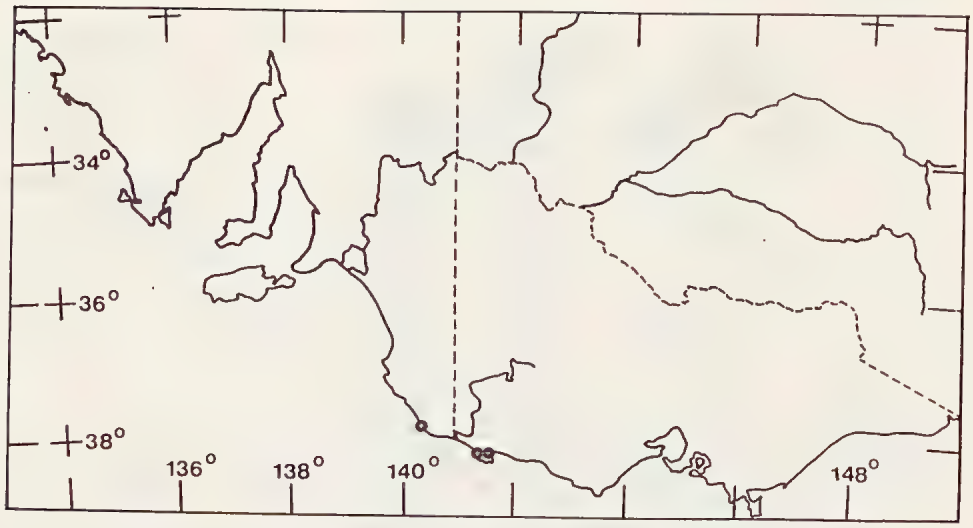


Fig. 4. Distribution of *Ixodia achillaeoides* ssp. *arenicola*.

*Hunt 1883*, Port MacDonnell, c. 25 km south of Mt Gambier, 14.ii.1964; *Mitchell s.n.*, Point Douglas, South-East, South Australia, 28.i.1978 (AD 97824002).

VICTORIA: South-west coast: *Bates 910*, coast near Alcoa Aluminium Smelter, Portland, 20.ii.1981; *A.C. Beauglehole 20127*, along coast, Bridgewater, Portland, Victoria, i.1945.

1c. ssp. **alata** (Schltdl.) Copley, stat. nov.

*Ixodia alata* Schltdl. in Linnaea 20: 593 (1847); Sond. in Linnaea 25: 495 (1852) Basionym.

*Type*: *Behr s.n.*, Barossa Ranges, (K, 1 spec., photo!).

*Ixodia achillaeoides* var. *alata* (Schltdl.) Ewart, Flor. Vict. 1144 (1931); Willis, Pl. Vict. 2: 725 (1972).

*Ixodia ptarmicoides* F. Muell. in Linnaea 25: 405 (1852).

Shrub, erect to 2 m. *Leaves* narrow-linear, linear, narrowly rhombic or lanceolate, 5-80 (-100) mm long, 1-10 mm wide, leaf-base decurrent, often forming wings down the stem, herbaceous, viscid. *Capitula* urceolate to sub-globose, 3.0-7.5 mm long, 1.5-5.0 cm wide; laminae of inner involucral bracts 1.0-5.0 mm long, 1-0-4.0 mm wide. (Fig. 5).

*Distribution* (Fig. 6)

This subspecies occurs on southern Eyre Peninsula, southern Yorke Peninsula, in the northern and southern Lofty regions, on Kangaroo Island, in the south-eastern region of South Australia, in the Grampians and along the south-west coast of Victoria from the mouth of the Glenelg River to Anglesea. A specimen was also collected by Captain S.A. White at Mobilong in the Murray Region of South Australia in 1884.

*Comments*

*I. achillaeoides* ssp. *alata* is a highly variable taxon with several recognisable leaf forms. At one extreme of this range of variation are plants with narrow, linear leaves and relatively small urceolate capitula, 30-40 mm long and 2.0-2.5 mm wide. At the other extreme are plants with broad-linear to lanceolate, decurrent leaves with


Fig. 5. *Ixodia achillaeoides* ssp. *alata*. A1, B1, C1, habit; A2, B2, C2, capitulum; A3, B3, C3, inner involucral bract with radiating lamina; A4, B4, C4, floret with receptacular scale; A5, B5, C5, achene (from A: *P.B. Copley 97*, adjacent to South West River Bridge, Kangaroo Island; B, *Melville 1687*, between Gorae West and Mt Richmond; C, *R.L. Specht s.n.*, 1 mile north-west of Millbrook Reservoir).

pronounced wings down the stems and relatively large suborbicular capitula, 5.0-6.0 mm long and 4.0-5.0 mm wide. The latter extreme grows in open stringybark (*Eucalyptus baxteri - E. obliqua*) forest communities on relatively deep sands and loams in the Mt Lofty Ranges of South Australia and south-western Victoria. The former, occurs mainly on skeletal calcareous or lateritic soils in a variety of plant communities on Kangaroo Island and southern Yorke and Eyre Peninsulas in South Australia. With more work several taxa may eventually be recognized in this group. However, the range of variation appears to be part of a clinal continuum. This is particularly evident on Kangaroo Island where virtually the entire range of variation occurs. Karyotypic studies may help to determine relationships.

### *Selection of Specimens examined* (258 seen)

SOUTH AUSTRALIA: Eyre Peninsula Region: *B. Copley 2889*, crest of ridge behind Wharminda, 4.i.1973 (AD); *Jericho 3*, Whalers' Bay area, Thistle Island, 24.ii.1975 (AD); *Specht 2023*, west of section 6, Hundred of Verran, Blue Range, 9.xii.1959 (AD).

Northern Lofty Region: *Donner 1048*, Humbug scrub, 14.iv.1963 (AD); *Donner 4763*, Black Hills, c. 15 km east of Burra, 23.iv.1974 (AD).

Murray Region: *S. Dixon s.n.*, Mobilong, 16.v.1884 (AD 97625387).

Yorke Peninsula Region: *B. Copley 4340*, c. 2 km east of Innes National Park Headquarters, 27.vii.1974 (AD); *Weber 4319*, between Pondalowie Bay and Shell Beach, 11.x.1974 (AD).

Southern Lofty Region: *Cleland s.n.*, Goolwa, 14.xii.1940 (AD 97227050); *Cooper s.n.*, c. 8 km north of Tunkalilla Beach which is c. 30 km west-south-west of Victor Harbor, 28.xii.1942 (AD 96229005); *P.B. Copley 6-10, 15*, southern boundary of Kyeema Conservation Park, 12.ii.1977 (AD); *P.B. Copley 23-29*, Boundary Road, near Carey Gully, 21.ii.1977 (AD); *Gardiner s.n.*, Para Wirra, near Elizabeth, March, 1962 (AD 96236126).

Kangaroo Island: *P.B. Copley 32-36*, c. 7 km east of Penneshaw rubbish dump, Dudley Peninsula, 4.iii.1977 (AD); *P.B. Copley 41-45*, c. 2 km from bitumen on road to South Coast Road from American River, 5.iii.1977 (AD); *P.B. Copley 108-112*, Harriet River crossing on east-west road north of Mt Taylor, 7.iii.1977 (AD); *P.B. Copley 121-125*, Scott's Cove Lookout, near Cape Borda, 8.iii.1977 (AD); *P.B. Copley 126-130*, Ravine des Casoars, north of West Bay, 8.iii.1977 (AD); *Jackson 898*, Stunsail Boom River, 14.xi.1977 (AD).

South-Eastern Region: *Hunt 641*, near Wolseley, east of Bordertown, 9.i.1962 (AD); *Sharrad 566*, c. 40 km south of Salt Creek, 15.iv.1960 (AD); *Williams 3466*, "Log Crossing" near "Cantara", Kingston, 2.xii.1969 (AD).

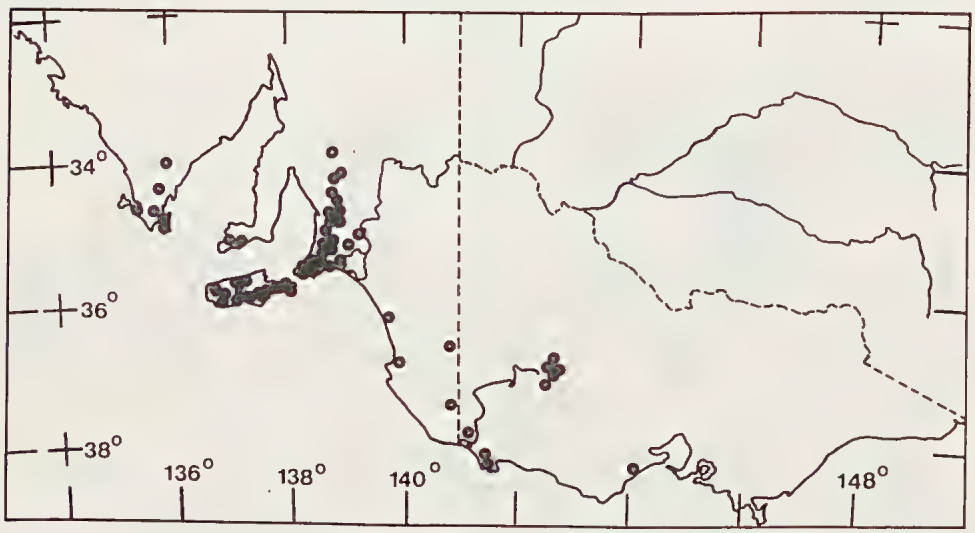


Fig. 6. Distribution of *Ixodia achillaeoides* ssp. *alata*.

VICTORIA: Grampians Ranges: *Ingwusen s.n.*, near kiosk, McKenzies Fall, Grampians, 10.ii.1965 (CANB 011095); *Ising 2317*, Mt Victoria, Grampians, 6.i.1927 (AD); *P. Mathews s.n.*, South of Moora-Moora Reservoir, Victoria Valley, Grampians, x.1976 (MEL 523910); *F. Robbins s.n.*, Mt Victory Creek, Grampians, i.1940 (MEL 520840); *Sharrad 1272*, Hall's Gap, Grampians, 19.i.1962 (AD); *Warcup s.n.*, Wonderland track below the "Wall of China", Grampians, 19.i.1961 (ADW 23661).

South-West Coast: *J. Anderson 362*, 12 miles south-west of Portland, along coast at Cape Nelson, 22.i.1969; *H.I. Aston 744*, northern boundary of Mt Richmond National Park, 22.x.1960.

## 2. **Ixodia flindersica** Copley, sp. nov.

*Frutex* 15-40 cm altus, ramis ascendentibus glabris. *Folia* crebro alterna in ramis junioribus, absentia ab senioribus, sessilia, linearia usque anguste vel elliptica, 5-25 (-50) mm longa, 0.5-4.0 (-7.0) mm lata, herbacea ad cartilaginea, atroviridia nitidaque supra, pallida infra, viscida; apex acutus; margo integra, plana; costa leviter impressa supra, prominens infra. *Inflorescentia* corymbosa terminalis, (1-) 2-6 capitulis, constans; *capitula* obovoidea usque cylindrica, (5-) 6-8 (-10) mm longa (3-) 4-6 (-7) mm lata, (25-) 30-50 bracteis involucralibus imbricatis pale viridibus vel testaceis, cartilagenis, glabris; *bracteae involucrales exteriores* ad tres quadrantes inferiores longitudinis appressae distale parum recurvatae, anguste oblongae usque anguste ellipticae, acutae; *bracteae involucrales interiores* spatulatae, laminis circiter $^1/_4$ longitudinis bracteae, alba, chartacea, petaloidea, acuta, pilis eglandulosis, simplicibus, subcylindricis, plus minusve complanatis, interdum lamina libris, interdum ad laminam perfecteve adnatis, in pagina adaxiali tecta; *receptaculum* conicum, bractea angusta unuquemque flosculum subtenenti; bracteae receptaculares involucralibus interioribus similes sed marginibus incurvatis ut basim flosculi amplextuntur partim circumcingent. *Flosculi* (30-) 40-70 (-110) in capitula quoque, pilis glandulosis in pagina abaxiali loborum corollae. *Achenia* 3- vel 4-angula, anguste oblonga usque obovata, circa 1.0-2.0 mm longa circa 0.2-0.7 mm lata, glabra; pappus cupuliformis, non profundus, breviter ciliatus. *Plantula* foliis rhombicis, 30-40 mm longis, 7-10 mm latis, herbaceis, supra glabris, infra leviter pilosis, non viscidis.

*Holotypus* (Fig. 7): *Lothian 3147*, southern slope of Mt Serle, Flinders Range, South Australia, 10.xi.1964 (AD 96503124).

Shrub 15-40 cm high, with ascending, glabrous branches. *Leaves* closely alternate on younger branches, absent from older branches, sessile, linear to narrowly-rhombic or elliptic, 5-25 (-50) mm long, 0.5-4.0 (-7.0) mm wide, herbaceous to cartilaginous, dark green and shiny above, pale below, viscid; apex acute; margins entire, flat; midvein slightly impressed above, prominent below. *Inflorescence* corymbose, terminal with (1-) 2-6 capitula; *capitula* obovoid to cylindrical, (5-) 6-8 (-10) mm long, (3-) 4-6 (-7) mm wide, with (25-) 30-50 imbricate, light-green to yellowish-brown cartilaginous, glabrous involucral bracts; *outer involucral bracts* appressed over lower three-quarters, slightly recurved distally, narrowly oblong to narrowly elliptic, acute; *inner involucral bracts* spathulate, with white, papery, petaloid, sharply to bluntly acute laminae about one-quarter of the length of the bracts and covered on their adaxial surface with simple, subcylindrical, somewhat flattened, eglandular hairs, sometimes free from lamina, sometimes partially or completely adnate to it; *receptacle* conical, bearing a narrow bract subtending each floret; receptacular bracts resembling inner involucral bracts but with margins incurved to clasp and partially surround base of floret. *Florets* (30-) 40-70 (-110) in each capitulum with glandular hairs on abaxial surface of corolla lobes. *Achenes* 3-4 angled, narrowly oblong to obovate, c. 1.0-2.0 mm long and 0.2-0.7 mm wide, glabrous; pappus a shallow, shortly ciliate cup (a "pseudo-pappus"). *Seedling* with rhombic leaves, 30-40 mm long, 7-10 mm wide, herbaceous, glabrous above, slightly pilose below, not viscid. (Fig. 7).

*Distribution* (Fig. 8).

*I. flindersica* is only known from the northern Flinders Ranges of South Australia from Ann Hill and Patawerta Hill in the south to Freeling Heights in the north.

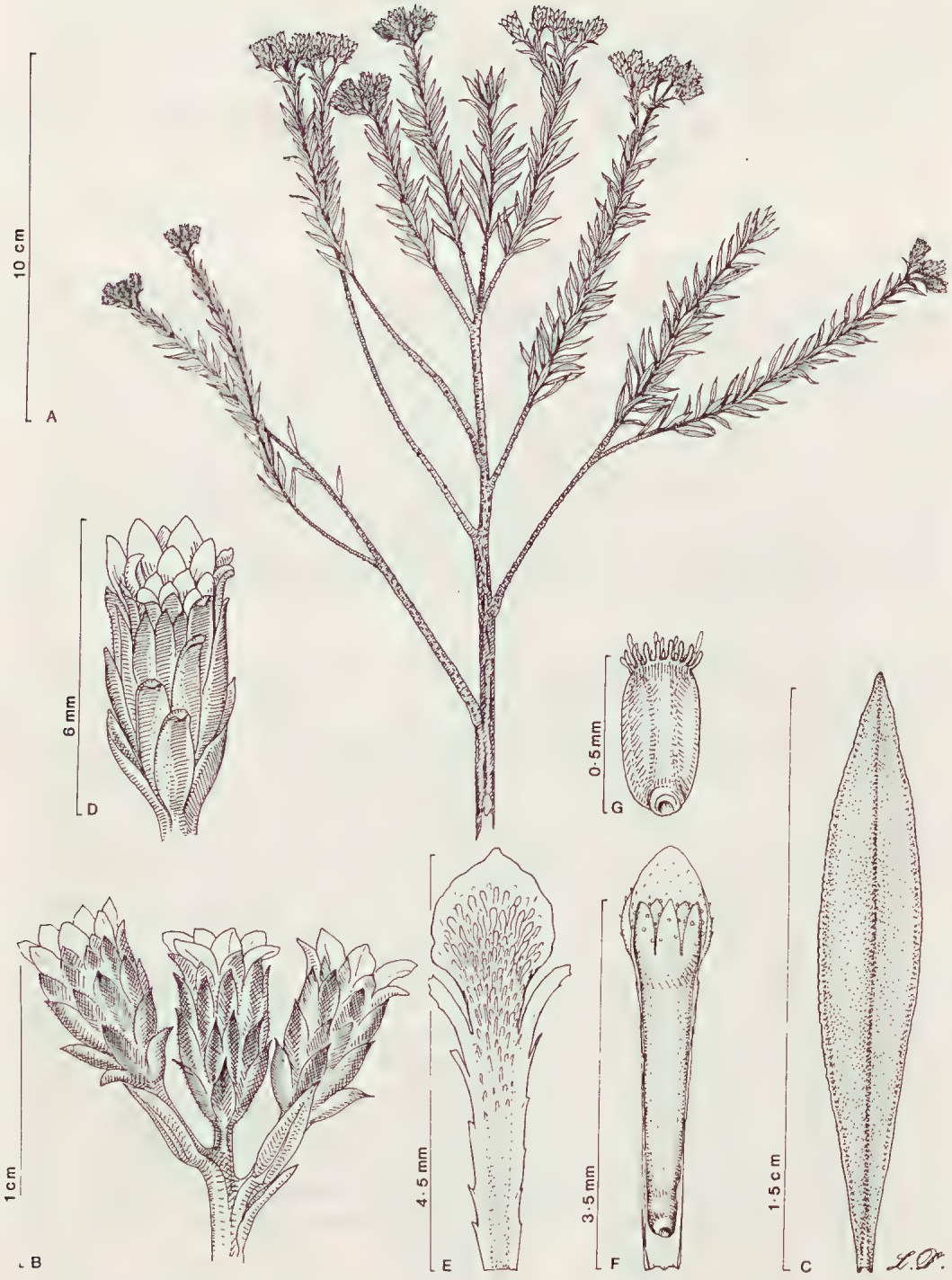


Fig. 7. *Ixodia flindersica*. A, habit; B, inflorescence; C, typical leaf; D, capitulum; E, inner involucral bract with radiating lamina; F, floret with receptacular bract-like scale; G, achene (from *Lothian 3147*, southern slope of Mt Serle, Flinders Range).

*Comments*

This species grows in rock fissures on the high rocky slopes of sandstone peaks and ridges in the region mentioned. Some specimens have, however, been observed growing in rocky creekbeds which flow out of the Gammon and Freeling Heights plateaux.

The specific epithet *flindersica* refers to the restricted distribution of this species in the northern Flinders Ranges. The species was also observed, but not collected, on rocky slopes in the Gammon Ranges National Park.

*Specimens examined*

SOUTH AUSTRALIA: Flinders Ranges: *Cleland s.n.*, slopes of Mt Serle, c. 45 km east of Leigh Creek, 31.v.1936 (AD 97227044); *P.B. Copley 153-155, 174-178*, upper slopes of Mt Serle, 8.iv.1977; *P.B. Copley 415-417*, upper rocky slopes of Patawerta Hill, 1.vi.1980; *P.B. Copley 418*, upper rocky slopes of Mt Tilley, 1.vi.1980; *P.B. Copley 420*, upper rocky slopes of Mt Andre, 3.vi.1980; *P.B. Copley 421*, upper rocky slopes of Mt Uro, 2.vi.1980; *P.B. Copley 422*, upper rocky slopes of the Cocks Comb, 3.vi.1980; *P.B. Copley 423*, upper rocky slopes of Ann Hill, near Point Well, 4.vi.1980; *P.B. Copley 425*, Balancing Rock, Yudnamutana Gorge, Arkaroola-Mt Painter Sanctuary, 16.vii.1980; *P.B. Copley 430*, Yudnamutana Waterfall, Arkaroola-Mt Painter Sanctuary, 16.vii.1980; *P.B. Copley 441-444, 447*, Freeling Heights, 22.vii.1980; *P.B. Copley 474-476*, Mt Rose, (north of Mt Serle), 30.vii.1980; *P.B. Copley 477*, Mudlapena Gap, Angepena Station, 31.vii.1980; *P.B. Copley 485*, gorge east of Patsy Springs Homestead, 31.vii.1980; *Kraehenbuehl 747*, rocky hills near Mt Serle, 13.x.1962; *Lang 825-827, 830, 831, 836, 837* (*P.B. Copley 184-191*), Mt Hack, 16.v.1977; *Lothian 3147, 3149*, southern slope of Mt Serle, 10.xi.1964; *Symon 3993*, upper slopes of Mt Serle, 4.iii.1966.

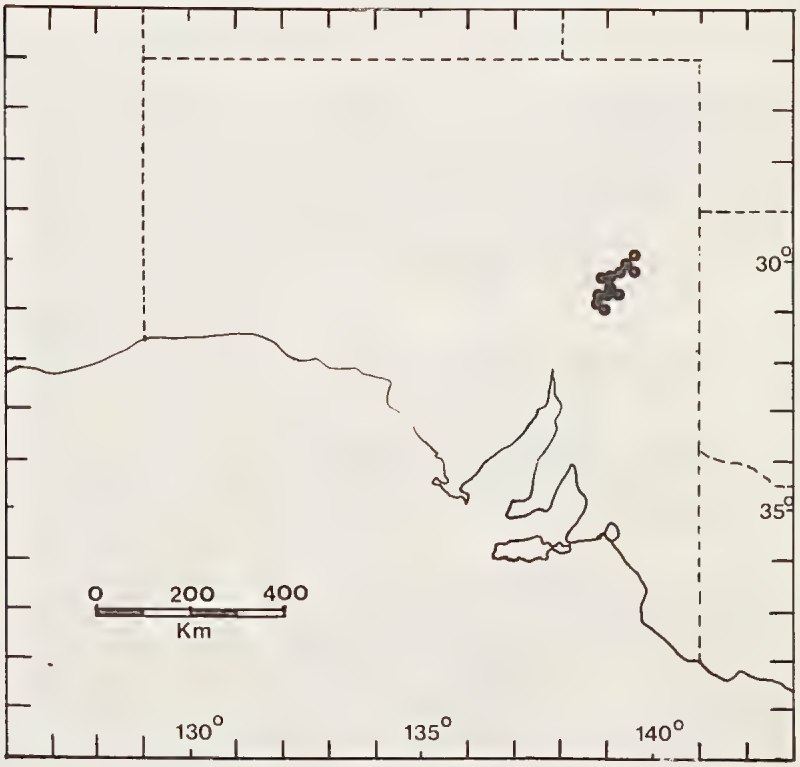


Fig. 8. Distribution of *Ixodia flindersica*.

## Acknowledgements

I wish to acknowledge the guidance and assistance of Dr J.P. Jessop and Dr D.C. Christophel, who supervised this study during my Honours year, and Dr W.R. Barker, Dr P.S. Short and Mr R.J. Chinnock, who advised on taxonomic problems. Dr W.R. Barker assisted with Latin descriptions, Mr Ludwik Dutkiewicz prepared the illustrations, and Miss Barbara Welling typed the manuscript. Also, my thanks are due to the Directors/Curators of the following herbaria for permission to use their facilities and specimens: AD, ADW and MEL.

## References

Aiton, W.T. (1812). "Hortus Kewensis" ed. 2, 4: 517. (Longman, Hurst, Rees, Orme and Brown: London).
Bennett, J.J. (Ed.) (1866). The miscellaneous botanical Works of Robert Brown. (Ray. Society: London).
Bentham, G. (1866). "Flora Australiensis". 3: 582. (L. Reeve: London).
Bentham, G. and Hooker, J.D. (1873). "Genera Plantarum" 2: 318. (William Pamplin, Lovell Reeve and Co., Williams and Norgate: London).
Black, J.M. (1929). Compositae. "Flora of South Australia" ed. 1, 4: 570-662. (Government Printer: Adelaide).
Brown, R. (Unpub.). Botanical Descriptions (Manuscript) of Australian Plants held by the British Museum (Natural History). (Positive microfilm: 22 reels at AD).
Brown, R. (1810). "Prodromus Florae Novae Hollandae". (Taylor: London).
Burbidge, N.T. (1958). "Note on a new species of *Ixodia* R. Br. (Compositae)". *Vict. Nat.* 75: 95-96.
De Candolle, A.L.P.P. (1837). "Prodromus Systematis naturalis Regni vegetabilis" 6: 154. (Paris).
Eichler, Hj. (1965). "Supplement to J.M. Black's Flora of South Australia". (Government Printer: Adelaide).
Ewart, A.J. (1931). "Flora of Victoria". (Government Printer: Melbourne).
Morris, D.I. (1977). "Miscellaneous notes on endemic Tasmanian plants in the genera *Olearia*, *Ixodia*, *Xyris*, *Danthonia*, *Tetrarrhena*". *Rec. Queen Vict. Mus.* 55: 1-5.
Mueller, F. von (1853). "Diagnoses et descriptiones plantarum novarum . . . ". *Linnaea* 25: 405.
Orchard, A.E. (1982). "The generic limits of *Ixodia* R. Br. ex Ait. (Compositae—*Inuleae*)." *Brunonia* 4(2): 185-198.
Schlechtendal, D.F.L. von (1847). "Bestimmung und Beschreibung der von Dr. Behr in Südaustralien gesammelten Pflanzen". *Linnaea* 20: 559-672.
Sims, J. (ed.) (1813). *Curtis's Bot. Mag.* 37: t. 1534.
Sonder, O.W. (1853). "Plantae Muellerianae. Compositae." *Linnaea* 25: 450-530.
Sprengel, C. (1827). "Systema Vegetabilium, Curae Posteriores" ed. 16, 4/2. (Göttingen).
Stafleu, W.T. (ed.) (1978). "International Code of botanical Nomenclature". (Bohn, Scheltema & Holkema: Utrecht).
Wakefield, N.A. (1951). "Some revision in *Helichrysum*". *Vict. Nat.* 68: 49-50.
Willis, J.H. (1972). "A Handbook to Plants in Victoria". Vol. 2. (Melbourne Univ. Press: Carlton).